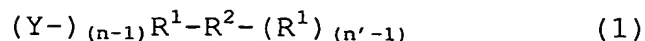


WHAT IS CLAIMED IS:

1. A method for producing a coupling compound of formula (1):

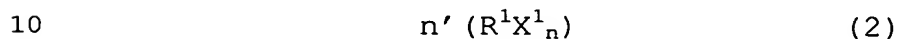


5 wherein R^1 , R^2 , n and n' are as defined below,

Y is R^2 or X as defined below,

which method comprises reacting

an organic halogen compound of formula (2):

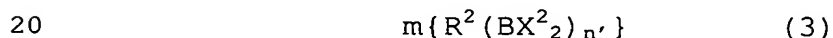


wherein X^1 represents a bromine or iodine,

R^1 represents a substituted or unsubstituted, linear, branched or cyclic hydrocarbon group of which α and β carbon atoms in relation to X^1 are sp^3 carbon atoms,

15 n and n' each independently represent an integer of 1 or 2, and provided that n and n' do not simultaneously represent 2,

with an organic boron compound of formula (3):



wherein R^2 represents a substituted or unsubstituted aryl group or a substituted or unsubstituted alkenyl group and the boron atom is bonded with a sp^2 carbon atom thereof,

X^2 represents a hydroxyl or alkoxy group,

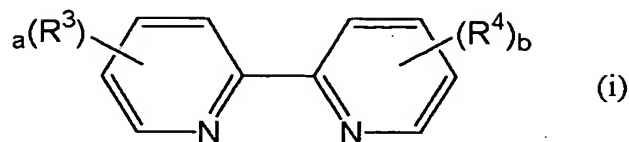
25 n' is as defined above,

m represents an integer of 1 or 2, and m is not more than n ,

in the presence of a catalyst comprising

a) a nickel compound, and

b) b-1) a compound of formula (i):



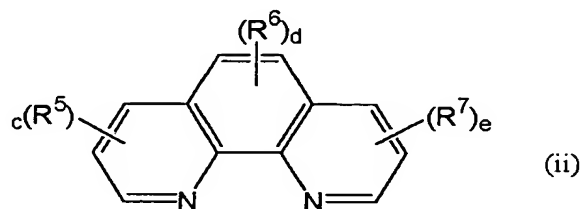
wherein R^3 and R^4 each independently represent

an alkyl, aryl, alkenyl, alkynyl, alkoxy, hydroxy,
 5 hydroxyalkyl, sulfo, alkyloxycarbonyl, aryloxycarbonyl,
 carbamoyl, cyano, isocyano, cyanato, isocyanato or formyl group,
 or a hydrocarbylsilyl group, and

optionally two adjacent groups among R^3 and R^4 groups with
 the carbon atoms to which they are bonded form a ring,

10 a and b are the same or different and independently
 represent an integer of 0 to 4, or

b-2) a compound of formula (ii):



wherein R^5 , R^6 and R^7 groups are the same or different
 15 and independently represent

an alkyl, aryl, alkenyl, alkynyl, alkoxy, hydroxy, sulfo,
 alkyloxycarbonyl, aryloxycarbonyl, carbamoyl, cyano, isocyano,
 cyanato, isocyanato or formyl group, or a hydrocarbylsilyl group,
 and

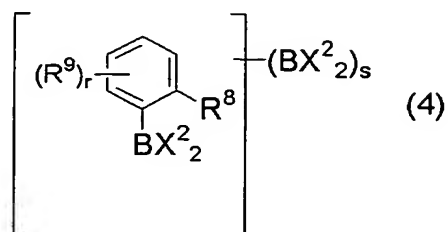
20 optionally two adjacent groups among R^5 , R^6 , and R^7 groups
 with the carbon atoms to which they are bonded form a ring,

c, and e are the same or different and independently
 represent an integer of 0 to 3, and

d represents an integer of 0 to 2; or

a mixture thereof.

2. A method according to claim 1, wherein the organic boron compound of formula (3) is a boron compound of formula (4):



wherein R⁸ represents a hydrogen atom,

r represents an integer of 0 to 4,

s represents an integer of 0 or 1,

R⁹ is the same or different and independently represents

a substituted or unsubstituted aryl group,

a substituted or unsubstituted heteroaryl group, or

a substituted or unsubstituted linear, branched, or cyclic alkenyl group, or

R⁹ groups bonded with adjacent carbon atoms of the benzene ring together with the benzene ring form an ortho, or ortho, peri condensed polycyclic aromatic ring,

X² represents a hydroxyl or alkoxy group, or

X₂² groups together form an alkylendioxy group, or

a boronic acid trimer thereof, and

r+s≤4 when the benzene ring does not form a condensed polycyclic aromatic ring.

3. A method according to claim 1 or 2, wherein the nickel compound is a nickel salt, or π complex compound of zero or divalent nickel.

4. A method according to claim 1 or 2, wherein R³ and

R^4 are alkyl and a and b are 1 or 2.

5. A method according to claim 1 or 2, wherein a and b are 0.

6. A method according to claim 1 or 2, wherein R^5 to R^7 are alkyl, and c, d and e are 1 or 2.

7. A method according to claim 3, wherein c, d and e are 0.

8. A method according to claim 1, wherein the compound of formula (i) is

10 dipyridyl, 4,4'-dimethyl-2,2'-dipyridyl, 4,4'-diphenyl-, 2,2'-dipyridyl, 5,5-dimethyl-2,2'-dipyridyl, 4,4'-di-t-butyl-2,2'-dipyridyl, 6-methyl-2,2'-dipyridyl, 2,2'-biquinoline, 6,6'-bi-2-picoline, 2,2'-bi-4-lepidine, 4,4'-dinonyl-2,2'-dipyridyl, 2,2'-dipyridyl-3,3'-diol, 2,2'-
15 biquinoliny-4,4'-dicarboxylic acid dibutyl ester, or 4,4'-dimethoxy-2,2'-dipyridyl, and

the compound of formula (ii) is

2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline,
2,9-dimethyl-1,10-phenanthroline,
20 3,4,7,8-tetramethyl-1,10-phenanthroline,
4,7-dihydroxy-1,10-phenanthroline,
4,7-diphenyl-1,10-phenanthroline,
4-methyl-1,10-phenanthroline,
5-methyl-1,10-phenanthroline, 5-phenyl-1,10-phenanthroline,
25 4,7-dimethyl-1,10-phenanthroline,
5,6-dimethyl-1,10-phenanthroline,
1,10-phenanthroline-2,9-dimethanol, or
2,9-di-n-butyl-1,10-phenanthroline.